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ABSTRACT

This paper presents 19 solutions to problems within the school environment: (1) ventilation (e.g., keep the thermostat fan on whenever the room is occupied); (2) filters (e.g., get rid of 20 percent cheap filters); (3) clean the ductwork; (4) avoid car and bus fumes by keeping vehicles 50 feet from the building; (5) sewer vents (vents must terminate at least 10 feet from a powered fresh air intake); (6) furnace exhaust pipes (if the furnace vent or other vent is closer than 10 feet from a powered fresh air intake, it must extend at least 3 feet above the intake); (7) floor and roof traps; (8) unvented science labs (which can send fumes into classrooms); (9) cosmetology odors (when there is no lab hood for ventilation); (10) CO2 testing (e.g., CO2 builds up when there are several persons in a room over several hours with inadequate ventilation); (11) asthma and respiratory ailments (e.g., carpeting should not be in schools, and ductwork needs regular cleaning); (12) UV lights (which kill most organisms in the air that pass through the ductwork); (13) cold temperatures (an adequate thermometer is important); (14) increased complaints about cold when proper ventilation blows air into the room; (15) asbestos testing; (16) radon testing; (17) lead paint testing; (18) water quality; and (19) mold. (SM)

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My School Makes Me Sick
Cheap Solutions to Environmental Problems in Schools

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1. Focus first on ventilation- ventilation is outdoor air entering each room and inside air leaving each room
   A. The red ribbon trick – Tie a ribbon on the diffuser source of air. Document whenever there is no air flow in an occupied room.

   B. The "Fan On" trick – Keep the thermostat fan switch set on "fan on" whenever the room is occupied. State building codes require 15 cubic feet of outdoor air per person in each occupied room, unless the window opens. See Ashrae guideline 62-1989.

   C. The paper trick – if the exhaust duct is working the suction will hold an 8x11 paper.
   Focus on the ventilation of the rest rooms. They should ventilate at least 60 cfm for each sink and toilet and urinal (fixture).

   D. Find the fresh air dampers on the roof or on the side of the building. The fresh air dampers should be open at least 25%
   On package units the metal mesh filters should be cleaned regularly.
   See the computer programming schedule for opening and closing the fresh air dampers.

   E. Air balancing – buy a balometer if you have central heat with ductwork.
   Teach the maintenance men how to balance the air flow in each room.
   This approach will correct imbalances in temperature and draft problems and save you the cost of servicemen or engineers.

2. Filters

   A. Get rid of the 20% cheap filters unless they are combined in series with a 60% filter. The cheap filter will make the expensive filter last longer.
   B. Ask for a tour of your filters
   C. Ask to see the written filter change schedule
   D. Ask to see the written ventilation checkup schedule

3. Cleaning Ductwork – most buildings with central ductwork have mounds of dust and bacteria piled inside and need cleaning

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4. Car and bus fumes – when cars park near fresh air intakes on the sides of the building the fumes are often sucked into the building. This is a great picture for the newspaper.

   Cheap Solution – keep vehicles 50 feet from the building.

5. When sewer vents on the roof are within 10 feet of powered fresh air intakes sewage odors can enter the building. Building code requires that all vents must terminate at least 10 feet from a powered fresh air intake. If the sewer vent or other vent is closer than 10 feet it must terminate at least 3 feet above the powered fresh air intake.

   Odor into the building. Quote the building code to the local gas inspector who will require the school to extend the sewer vents above the fresh air intakes.

6. Furnace exhaust pipes – fumes can get into nearby fresh air intakes. If the furnace/boiler vent or other vent is closer than 10 feet from a powered fresh air intake it must extend at least 3 feet above the powered fresh air intake.

7. Traps

   a. Floor traps dry out and allow sewer fumes into the building

   Cheap solution – see the plumber for the liquid meant for traps. The liquid does not evaporate.

   B. Roof traps - dry trap syndrome. Traps on the roof dry out, (such as on a central air conditioning system), and then suck bacteria, sewage fumes, and furnace exhaust fumes into fresh air openings and windows.

   Cheap solution – see the plumber for the liquid meant for traps. Fill the outdoor traps with antifreeze liquid in October.

8. Science labs not vented – sending fumes into classrooms causing evacuations.

   Cheap solution. Block the return with a manual or electric damper. When using an electric damper, run the wire mold over to the wall, down to a wall switch then down to a wall plug. The cost is $300 for materials. When the lab produces fumes or odors turn the switch on to close the damper. This blocks the return to keep lab fumes out of the ductwork and halls. Turn on the lab exhaust hoods to ventilate.

9. Cosmetology odors throughout the building or no lab hood for ventilation.

   Cheap solution. Install a exhaust blower in a window (you might have to cut the glass). The louvers will push open when the fan is on. Use a variable speed control (estimate $400)

   Block the return with a manual or electric damper. Run the wire mold over to the wall, down to a switch then down to a wall plug.

   The cost is $300 for materials. When the lab produces fumes or odors turn the switch on to close the damper. This blocks the return to keep lab

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fumes out of the ductwork.

10. The CO2 testing game- CO2 is much of what people breath out. The State has a guideline limit of 800PPM (parts per million). Ashrae recommends a limit of 1000PPM. CO2 buildup occurs when there are several persons in a room over several hours with inadequate ventilation. If CO2 testing is done early in the morning or with only a few students in the room the CO2 reading will be low. If testing is done with a full classroom after several hours, the CO2 test will give an accurate CO2 reading. Watch out for the CO2 testing procedure used by engineers.
    I recommend buying your own expensive CO2 meter. It is much cheaper than an engineer and can be used repeatedly on your own preplanned schedule.

11. Asthma and respiratory Ailments

    A. Carpeting should not be in schools. It provides a home for bacteria and mites and mold. If you must keep the carpets, vacuum them daily with a hepa vacuum.
    B. The steam cleaning game – rugs need steam cleaning whenever they get wet and otherwise at least twice per year. The steam cleaning game is that steam cleaners often do not get hotter than 140 degrees. The rug needs steam of at least 212 degrees to kill every organism in the rug.
    C. Clean the ductwork. It probably has many years of dirt mold and fungus It won't get dirty again if they use $60% filters.
    D. Mold – When you see mold it is always from water. Throw away the material.

12. UV lights - ultraviolet lights are cheap and can be inserted into ductwork. They cost in electricity the same as a light bulb. They kill most organisms in the air that passes through the ductwork.

13. I'm cold –
    Cheap solutions - Provide an accurate ($8) thermometer. Keep a daily record of the temperatures. Attach a copy of the list to the building complaint form. Keep a copy and give one to the Health & Safety Committee.

14. I feel cold - proper ventilation increases the cold complaints.
    Many cold room complaints are actually caused by a draft. If the air blows on you and you are sensitive it feels cold.

    Drafts
    Cheap Solutions:
    A. Direction diffusers – have the maintenance department change 4 way ceiling diffusers to 3 way ceiling diffusers. Don't reduce airflow.
    B. Deflector – Hang a wood or metal plate along the edge of the

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diffuser that is responsible for the draft. This deflector will stop the drafty feeling without reducing air flow/ventilation.

15. The asbestos air testing game – Engineers and labs make a lot of money doing improper asbestos air testing without using the blower procedure. these improper tests come up negative and satisfy a gullible public. The EPA will tell you that asbestos air testing is often expensive and worthless. It often only provides an impressive legal document for the public. The only true test of asbestos in the air is done with a blower in a closed restricted access area. All other tests are questionable. Most air sampling is done without the blower. There could be piles of asbestos powder in a room next to the air monitor and the test results would be negative if a blower is not used.

16. Radon – naturally occurring gas in soil – it passes into the school through openings around pipes and cracks in the foundation. Tests are done on the first floor or basement. Radon fumes cause cancer.
Cheap Solution - Call the State for free testing.

17. Lead paint – Many schools have lead paint. If students are under 6 years old or the paint is being sanded be concerned.
Cheap Solution – buy a lead testing kit from the hardware store or on the internet. Choose the hinge side of a door and with permission do a lead test.

18. Water quality – schools generally have good testing practices and decent quality water. Two suggestions:

    A. Change the Master Plan for water testing to test fixtures that have not been tested before
    B. If you worry about an impurity in the water such as arsenic, go to a testing laboratory and get a bottle and a copy of the protocol and do your own testing. The cost for arsenic testing is $20.00

19. Mold – Whenever you see mold in building materials the material must be disposed of properly.

References:

Ashrae guidelines 62-1989

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